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ORIGINAL ARTICLES

CLINICAL EXPERIENCES WITH INSULIN IN THE TREATMENT OF DIABETES MELLITUS.*

(From the Clinic of the Bayside Hospital)

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The discovery of insulin has to a large extent revolutionized the treatment of diabetes. However, there are many problems connected with its clinical application that have not been satisfactorily solved. The diabetic who is taking insulin has lost his automatic adjustment and cannot eat as he pleases and take sufficient of the extract to maintain a normal blood sugar, but is obliged to take a fixed dose of insulin and a fixed diet.

The modern treatment of diabetes is based on the belief that it is a disturbance, either of the total metabolism, or that of carbohydrates only. Adherents to the total metabolism hypothesis advocate starvation methods. Those believing that only the carbohydrate metabolism is involved employ the high fat method or some modification of it. This does not imply, however, that the carbohydrate fat ration can be safely ignored.

There is a growing belief that many diabetes follow acute infections, and it is an accepted fact that most infections, particularly the pyogenic type, retard the function of the islets. On the contrary, it is definitely proven that regeneration or, at least, restoration of function occurs at times in clinical cases. Experimental observations on animals have demonstrated that regeneration is possible.[1] Clinical experience suggests that a persistent, high blood sugar leads to a progressive deterioration of the islet tissue, and a constantly maintained normal blood sugar level is apt to be followed by an increased functional capacity. This is not uniformly true, as there are cases that show little or no tendency to become more severe, or to improve, whatever the blood sugar level may be. No satisfactory explanation for this phenomena has been offered.

*Read before the Fifty-first Annual Meeting of the Florida Medical Association, held at Orlando, May 15, 16, 1924.

McLeod[2] suggests that the normal control of the secretion of the islets is either through the hormone action of an increased blood sugar or through the nervous system. It seems almost certain that both factors are capable of influencing the activities of the islets.

All clinical evidence tends to prove that insulin acts in two ways. It causes a withdrawal of sugar from the blood and its storage in the muscles and liver, and it accelerates the combustion of glucose, and incidentally, the normal metabolism of fats. One of the questions that has not been satisfactorily answered, is the effect of insulin on the pancreatic secretion. It has been thought that it might be inadvisable to reduce the blood sugar to too low a point on account of the inhibiting effect on secretion. Contrarily, it may be argued that this rests the pancreas and ultimately tends to improve its function. Our experience suggests that this is the case and that it is often of value to reduce the blood sugar below 100 mg. It has been apparent that there are two classes of cases. First, those with fixed islet secretion, in which insulin administration, apparently, has no influence on pancreatic secretion. Second, the mobile group, in which insulin administration, apparently, is followed in the beginning by decreased pancreatic secretion. Later, after the islets have rested, there is a marked tendency to increased functional capacity.

INDICATIONS FOR THE USE OF INSULIN AND CLINICAL METHODS

There are six classes of cases suitable for insulin therapy:

1. Coma or severe acidosis.
2. All cases that are unable to maintain a blood sugar of 160 mg. or less on a properly balanced diet, containing 70 gms. of carbohydrate.
3. Certain individuals that are so constituted that they will not follow a severely restricted carbohydrate content of the diet.
4. Cases showing emaciation, in which it is advisable to allow a gain in weight.
5. Cases during the course of acute infections.
6. Cases subjected to surgical procedure.

At present, the only effective method of administering insulin is hypodermically, one to four

or more times daily, fifteen to thirty minutes before meals. The maximum effect is produced in three to four hours. The duration varies from six to twelve hours.

The question of diet is an important one. Aside from cases showing severe acidosis or coma, two procedures are available. First, by the use of a system of diets, such as Joslin's,[3] to get the patient sugar free. The diet is then increased until sugar appears in the urine. Sufficient insulin is then administered to keep the blood sugar normal and to take care of subsequent additions to the diet. Second, fixing the diet at an arbitrary point and rapidly increasing the insulin until the blood sugar becomes normal. Later, adjustments are made as required.

In the treatment of coma, 20 units of insulin are given intravenously and 20 subcutaneously as the initial dose and subsequent doses as necessary, controlled by frequent blood sugar determinations. In the earlier cases, carbohydrates were given as a buffer, but Joslin[4] has shown that this is unnecessary and requires a larger dose of insulin.

The laboratory technique necessary in fixing the dosage may be divided into three types: First, controlling the dosage entirely by blood sugar determinations. Second, the combined method—frequent examination of the urine until it becomes free of sugar. Following this, blood sugar determinations are used to fix the blood sugar level. Third, the method advocated by Page[5] based on the Benedict-Osterberg quantitative urine sugar determinations.

The method we are now using is as follows: On entrance, the patient is put on a basal requirement diet containing 50 gms. of carbohydrate, independent of the 58 per cent protein factor. Initial blood sugar determinations and C-02 combining power are made. After a period of observation, insulin is begun, and controlled by two hour examinations of the urine until it is free of sugar, then by blood sugar determinations, both fasting and after the morning or noon meal. The diet and insulin are then increased simultaneously until a suitable diet for the requirements is reached. Our policy has been in fixing the final diet to be liberal with the carbohydrate content, and to be sure sufficient calories are available to maintain the body weight under normal activities. Sufficient insulin is given to keep the blood sugar under 145 mg. per 100 cc. blood. In severe cases, where a liberal diet is given, the blood sugar has a tendency to run up during the night. In these cases, two to six units are given at midnight until the pancreas is able to maintain a normal sugar level under fasting conditions.

ANALYSIS OF 18 CASES TREATED WITH INSULIN

The maximum and minimum morning blood sugar on admission was 666 mg. and 181 mg. per 100 cc. blood and on dismissal, 182 and 102. The lowest blood sugar noted during treatment was 69 mg. Mild symptoms of hypoglycæmia were noted only once with a blood sugar of 74 mg. The average kidney threshold for sugar was 178 mg.

The maximum dose of insulin was 280 units of H-10 in 24 hours, the smallest 14 units of H-10. The average 24-hour dosage of H-10 was 31 units, and of U-10, 44 units. Two cases received three doses daily, six received two doses and nine received a dose before each meal and an additional dose at midnight.

The average carbohydrate content of the diet was 110 gm. independent of the proteid content.

The following complications were present: Hypertension was found in four cases, albuminuria in sixteen, boils in one, infected tonsils in one, tonsilectomy was done once. Adiposis dolorosa was present in one case, hemiplegia in one, ulcer on foot in one, cataracts in one, and neuritis in one. Two cases showed evidence of arteriosclerotic heart disease and failure of the congestive type. One case showed tuberculosis of the lungs and one was complicated by encephalitis. The average age was 52. Two cases were under twenty. One of these cases entered the hospital in coma with a plasma C-02 power 11 per cent. The other, while not in coma, showed a severe acidosis, the plasma C-02 power being 32 per cent.

The average duration of hospitalization was 18 days. The maximum and minimum duration was 38 and 6 days, respectively.

The results achieved while in the hospital were satisfactory, except in one instance, in which the patient decided not to continue the treatment after five days. There were no deaths during the hospitalization period.

These cases have been under observation since their discharge from the hospital, from a few weeks to one year. The subsequent history shows that two severe cases have been absolutely unsatisfactory. In the coma case, this was due primarily to indiscretion in diet, but also to irregularity in taking the insulin. This boy was quite thin

previous to treatment, and has since leaving the hospital gained 40 pounds in weight. His physical condition remains good, but it is impossible to maintain a normal blood sugar level for any length of time. The second case, a boy 19 years of age, remained in normal condition for one month. Following this, his blood sugar was found to be 400 mg. The cause is as yet undetermined. Both of these cases show a disposition to get progressively worse when the blood sugar is above 180 and evidence of progressively increased pancreatic function while the blood sugar is normal. Once their blood sugar becomes definitely high, it is practically impossible to reach a normal level without hospitalization. Two cases show a partially satisfactory course. Occasionally, the blood sugar is high, but strict adherence to the diet and iletin dosage leads to a prompt return to normal. Eight have shown a disposition to maintain a normal blood sugar, constantly. Two cases showing cardiac failure died in the first six months after leaving the hospital. The cause of death was cardiac. The diabetic condition remained under control up to the time of death. Four cases have definitely been able to reduce the dosage of insulin, showing an improvement in pancreatic function. Two cases are apparently cured. One case, that of an elderly individual, of 10 years' duration with an initial blood sugar of 450 mg., two months after leaving the hospital, developed rather acute symptoms of hypoglycæmia. Following this, he discontinued the insulin and continued the same diet containing 100 gms. carbohydrate. Two weeks later, his blood sugar was 138 mg. and in three months, 125 mg. In case 2661, a severe chronic infection of the tonsils was present, for which tonsillectomy was done. He was discharged on a diet of 150 gms. carbohydrates and 16 units of insulin. After six weeks, he was able to discontinue the insulin and has remained normal since, in spite of a constant gain of weight.

The effect of insulin treatment on the complications of diabetes has not been definitely settled. The mass of evidence accumulating, however, suggests that the effect is most marked on the infections, chiefly tubercular and pyrogenic. The complications dependent upon changes in the nervous and arterial system may be arrested but are not likely to be entirely relieved.

PROBLEMS OF TREATMENT AFTER HOSPITALIZATION

There is no difficulty in maintaining a normal blood sugar during the hospital period. There are some individuals, however, who are so constituted that it is impossible to get them to live on a fixed diet for any length of time, however liberal it may be. Our experience has demonstrated that women are more faithful in carrying out the dietetic instruction than men. Certain cases have been careless about the insulin, showing a disposition to leave off doses, and even to change the dosage without advice. The most serious problem we have encountered, however, is in the youthful transgressors in whom, once the blood sugar becomes markedly elevated, large doses of insulin are required, temporarily, to bring the sugar to a normal level.

CONCLUSIONS

1. In order to get the best results, it is necessary to maintain a blood sugar level night and day not above 145 and preferably between 100 and 120 mg.
2. The best method of treatment is that which is easiest for the patient.
3. The diet should be as liberal as conditions will permit.
4. Insulin offers a chance for recovery, and definite relief to those who are faithful and conscientious in carrying out the treatment.

(Credit is due Miss E. C. Noxon and Dr. Herbert R. Mills for valuable assistance in the preparation of this paper.)

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DISCUSSION

Dr. J. B. Wallace, Tampa:

I think Dr. Bitzer has covered the question of the administration of insulin quite thoroughly in this paper of his. I think that we will all agree that any case of diabetes that is severe enough to require insulin should be hospitalized, and that it should be kept in the hospital for the purpose of urinary and blood pressure observations, and for diet. I think that one very important thing in Dr. Bitzer's paper is the selection of cases for the use of insulin. I do not think there could be any possible criticism of the cases Dr. Bitzer referred to.

I think there is a certain type of case that is not likely to follow any careful dietetic instruc-

tions, and I do not think that type of diabetic is likely to do well under any treatment we can use. My personal preference, in determining those to whom insulin should be given, has been in putting the patient on a test diet and handling them that way, if possible, except in cases that are emergencies. I am of the opinion that in spite of insulin, the treatment of diabetes is still very largely a dietetic problem.

Dr. J. V. Freeman, Jacksonville:

Insulin marks a tremendous step forward in the management of diabetes, but it is not the complete answer. We need to discover the exact etiology of the disease in order that we may take the proper steps toward prophylaxis.

As mentioned by Dr. Bitzer, it seems probable that our old friend, focal infection, plays a considerable part in this disease. Probably if we give attention to that particular factor of foci of infection and the eradication of them, we will see some diminution in the number of cases of diabetes.

The tremendous value of the insulin is, of course, in the ready and prompt control of acidosis and coma. Its next great value is in increasing the tolerance of those patients who are not able properly to handle their maintenance diet. The idea also prevails and seems firmly based that the use of insulin holds the blood sugar within normal limits, giving rest to the pancreas so that it can recover a certain amount of its function. This seems to be more true in young cases than in the old ones.

As Dr. Wallace has just stated, the principal problem of diabetes is still the dietetic one. The use of insulin imposes on us more than ever before the careful study of the diet and the careful test of the patient. We must determine the patient's reaction to a given diet—to his test diet and to his maintenance diet. It is a very troublesome proposition, by that I mean that it is a painstaking proposition to study out the proper diet for these cases, but there is no other course left to us. We shall have to become perfectly familiar with the calories. It would be just as irrational for us to tell the patient to leave off his sugars and starches and take this much insulin, as it would be to tell the man with rheumatism, "Well, just let it take its course, you can't help yourself," and get our fee. The instruction of the patient is, in my judgment, a particularly important factor. While these patients are hospitalized we have the best opportunity in the world to instruct them in the basic principles of diet, the making of examinations and tests for their own experience, the administration of the insulin, and in acquiring some degree of familiarity with the symptoms of their disease.

I think it is safe to say that at least 50 per cent of the cases of diabetes are successfully managed and should be managed by diet alone. Insulin should be reserved for the severe cases, the cases with acidosis and coma, for the cases in children, and for those cases of diabetes who have developed infections or are to be operated upon.

Dr. T. Z. Cason, Jacksonville:

I feel that I would like to emphasize what Dr. Wallace stated with reference to the paper under discussion, and that is patients (and I do not agree with the paper in this point) who are not willing to be very careful of their diet should not be given insulin. If you are not going to take the time to instruct the patient how to handle his diet in the treatment of his disease, and to calculate it into calories and divide the carbohydrates, proteins and fats, and to make the exact determination right throughout, how are we to know that he is not willing to follow it, and should not be given insulin?

I had the pleasure of watching Joslin for three weeks last fall. He is of the opinion that it is a luxury to give insulin to a patient who is over 40 years of age. Under 40 years old, where it is needed, it should be given. I also feel that insulin has been administered too indiscriminately, and I do not think that a doctor should give it unless he, himself, is able to calculate the diet just as he should instruct his patient to do.

Dr. H. H. Harris, Jacksonville:

I would like to ask Dr. Bitzer if he has observed that a number of diabetics who are taking insulin complain of diminished vision, which seems to clear up as soon as the insulin is discontinued. Quite a few of my patients have been affected this way?

Dr. E. W. Bitzer, Tampa, (closing):

One of the cases reported as arrested or partially cured, an elderly subject, emphasizes the fact that there can be marked changes in the pancreatic function even in the elderly diabetic. As I recall he was in the neighborhood of 65 years of age. He had had diabetes for about ten years, and his blood sugar was 450 mg. After a comparatively short period of treatment, possibly two months, he was able to discontinue the

insulin completely, and maintain practically a normal blood sugar.

The question as to who shall be given insulin is undoubtedly one of the most important of the problems connected with insulin. If we are to obtain good results, it is, of course, necessary for the patient to follow instructions as to diet, reasonably accurately.

As to Dr. Harris' question in reference to an increase in diminution of vision following the use of insulin, in cases showing impairment of vision my experience has been that there has been no effect on vision in these cases.

SPIROCHETOSIS BRONCHIALIS, WITH REPORT OF CASE.*

J. Brown Wallace, M. D.,
Tampa, Florida.

W. M. B., male, white, age 17, occupation, student. Seen November 25, 1923.

History: Cold and fever followed by pneumonia ten months ago. Has had since that time cough with moderate expectoration of thin, watery, odorless sputum. Slight hemoptysis two months after pneumonia, and occasional blood stained sputum since. Easily tired out. Weight prior to pneumonia, 140 pounds; present weight, 130 pounds. No other symptoms.

Previous history: Ordinary diseases of childhood. Had never been out of Florida.

Physical examination: Negative except for high-pitched inspiratory rales along right border of sternum. Mouth, teeth, gums and throat were normal. The red, white and differential blood counts were within normal limits.

Examination of urine was negative.

Examination of sputum showed many spirochetes resembling those of Vincent's angina.

Examination of stool: Positive hookworm; many ova found.

X-ray report: "Marked thickening around the hila and an increase in density above this level on both sides, especially on the right. The markings are unusually distinct and extend well toward the periphery. There are several areas on both sides above the level of the fourth rib strongly suggestive of pulmonary tuberculosis. The descending bronchial tree outlines can be seen to the level of the diaphragm and well out to the cortical portion."

Repeated examination of the sputum showed constantly the presence of numerous spirochetes; fusiform bacilli were not definitely demonstrated in any specimen. All specimens were negative for tubercle bacilli.

The patient was given treatment for the hookworm infection, repeated in one week; .6 gm. neoarsphenamine was given intravenously every third day for three doses—after an interval of one week the neoarsphenamine was repeated twice.

Since that time no spirochetes have been found; a month later patient was free of cough and fever and has remained well since.

Spirochetosis bronchialis or hemorrhagic bronchitis was first described by Aldo Castellani from Ceylon in 1906, when he reported two natives subject to recurrent attacks of hemoptysis for several months, with sputum negative for tubercle bacilli, but containing large numbers of actively motile spirochetes.

Since that time numerous cases have been reported from various tropical countries.

During the World War many cases were observed in Europe among native troops coming from the East as well as among the European forces who had never been to the Colonies. Prior to that time the disease had attracted little attention in Europe. J. R. Risquez, Caracas, Venezuela, reported in 1923 seventy-six cases found in Caracas and vicinity.

In 1910 Rothwell described four cases in the United States, of what he termed bronchial Vincent's angina, in which spirochetes and fusiform bacilli were found in the sputum. As will be pointed out later, these cases probably represent a different variety of spirochete infection from that under consideration. In 1921 Levy reported two cases of broncho-pulmonary spirochetosis from Galveston, Texas. One of these cases had had hemoptysis at intervals for fourteen years. Bloedorn and Haughton in 1921 reported four cases from the U. S. Naval Hospital at Annapolis, Md. A. E. Greer in 1923 reported another case from Houston, Texas.

There is a general acceptance of Castellani's description of three types of the disease; the acute, subacute and chronic. In the acute type there is moderate fever, rarely over 103, severe cough with scanty expectoration, which may contain traces of blood.

*Read before the Fifty-first Annual Meeting of the Florida Medical Association, held at Orlando, May 15, 16, 1924.

In the subacute type, which may last from two to several weeks, there is slight fever, troublesome cough with expectoration of pink jelly-like mucus or true hemoptysis. The physical signs as a rule are those of a simple bronchitis, but may be unilateral and closely simulate an early tuberculosis infiltration.

The chronic type may follow an acute or subacute attack, or more frequently it has a slow, insidious onset. The patient has a chronic cough, and expectoration which may contain blood. Frequently there is no fever, or there may be an irregular temperature. Physical examination usually shows only a few rales. The course of this type may be prolonged with periods of improvement, and even apparent cure.

The diagnosis is established by laboratory examination of the sputum. The spirochetes are easily found in specimens stained by the Fontana method, with carbol fuchsin, or with gentin violet.

Treatment: Arsenic in almost any form is reported effectual. On account of the ease of administration and the prompt results obtained, most observers prefer arsphenamine or neoarsphenamine intravenously. Dr. Risquez treated his cases with antimony and potassium tartrate solutions intravenously. Emetin has not proved effective.

A review of the literature of spirochete infections of the respiratory tract is apt to be somewhat confusing unless it is accepted that there are two varieties of spirochetes capable of producing pulmonary lesions, one which is essentially a tropical disease, but existing in the United States and probably considerably more frequently than is generally recognized, and the other due to an invasion of broncho-pulmonary tissues by the fusiform bacilli and spirochetes of the tonsil crypts and tartar deposit at the margin of the gums. Fishburg, Morris and Kline, in 1921, reported a series of cases admitted to Montefiore Hospital as tuberculosis. The symptoms and signs were those of pulmonary abscess with pain in the chest, high continuous fever, incessant cough and copious expectoration of offensively fetid sputum. Spirochetes and fusiform bacilli were found in the sputum and at autopsy in the pulmonary tissues.

Davis and Pilot, in an interesting study of the bacillus fusiformis and Vincent's spirochetes, conclude that under exceptional circumstances these organisms which are very generally present in the crypts of the tonsils and the tartar deposits about the teeth, may become implanted in any adjacent tissues, producing gangrenous and putrid infections. They say "the question has been already raised as to the relation of Castellani's spirochetes to the spirochetes of Vincent that occur in the putrid lung conditions associated with fusiform bacilli. At the present moment, the idea prevails that the two are different and that the former is peculiarly a tropical spirochetosis in which symbiosis with fusiform bacilli does not play a significant role."

Up to the present time very few cases of bronchial spirochetosis have been reported from the United States, but very probably its occurrence in the South is being overlooked.

The presence of spirochetes in specimens of sputum examined for tubercle bacilli at the Tampa laboratory of the State Board of Health, is not an exceedingly rare finding. No report, however, of the presence of spirochetes in sputum is made. The subacute and chronic types of this infection have commonly been diagnosed as tubercular infections, the history and occasionally the physical signs giving quite a characteristic picture of mild tuberculosis. The differentiation can only be made by laboratory examination of the sputum.

Since the infection is so amenable to treatment as compared to tubercular infection, it is most important that the possibility of this disease be generally recognized.

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DISCUSSION

Dr. R. H. McGinnis, Jacksonville:

Dr. Wallace has reviewed and given a synopsis of the literature of spirochetosis bronchialis since the disease was first brought to the attention of the medical profession by Castellani.

There is still much confusion among scientists

about the invasion of the body tissues by spirochetes, the character of the spirochetes and their classification. Some writers seem to think that the organism producing the disease in question is a saprophyte under normal conditions and becomes pathogenic from causes not yet determined.

This disease, however, when once developed, must be differentiated from pulmonary tuberculosis as many of the symptoms and findings of the examination are almost identical. The spirochete is usually found in the sputum of patients with the disease in large numbers by some specific staining agents.

While we know little about the spirochete of this variety we can treat the disease successfully by some preparation of arsenic.

It is possible that many cases of this disease are never diagnosed correctly, and are reported, if reported at all, as tuberculosis.

Dr. W. C. Blake, Tampa:

Dr. Wallace has presented a very interesting paper, because it brings to our minds the frequency with which this disease is met, though not always recognized.

Clinically they are diagnosed as tuberculosis, and to detect them it is necessary to do more than make a routine examination of the sputum for tubercular bacilli. The laboratory man should be instructed always to look for and report such things as spirochetes, fungi, and ova. I had the opportunity of examining one or two specimens from Dr. Wallace's patient, and these contained myriads of spirochetes.

As has been stated, these cases are clinically recognized as tuberculosis, but there are two forms of differentiating between them. One method is the X-ray, but X-ray evidence is usually lacking. The other is that the sputum in tuberculosis is usually thick, heavy and mucopurulent, whereas it is usually thin and watery in these cases.

Let us remember that every clinical case of tuberculosis may not be tuberculosis, and that the laboratory man can assist us in occasionally finding one of these cases.

Dr. Barnes:

I first became interested in this question of the non-tuberculous type of referred diagnosis of tuberculosis, while at Fort Baron.

I might say in passing that from our experience there in working with actinomycosis it would simulate almost any other organism. We found many fusiform bacilli in the sputum of our patients, and later proved them to be actinomycosis organisms. In this connection I want to point out that this particular organism is very hard to grow, our laboratory technicians requiring several weeks to finally get the work across. Therefore many times our laboratory people have been without these organisms in the work of bacterial study.

Now, the importance or purpose with which we took up the question there was to find out something of the percentage, which we could not find very definitely in the laboratory. So we set aside four wards containing fifty-four patients each, or two hundred and sixteen cases, just as we happened to have them, and made a study of these two hundred and sixteen cases, and found some thirty per cent having the fusiform bacilli, actinomycosis, or your spirochetes. Now this is very important. If we are going to be able to find thirty per cent of our so-called tuberculosis involved in this particular form of trouble, remember that the ultimate diagnosis of tuberculosis was not complete in these two hundred and sixteen cases except, for instance, by the finding of tubercular bacilli in the sputum. Therefore the finding of thirty per cent of these, or a little more than sixty cases, represents something of value. This seems of further importance in regard to the entire question of tuberculosis. That is, that practically forty-two per cent of all charity today is caused by tuberculosis in some form, and this brings up an entirely different angle to the cause of tuberculosis in any particular area.

There is a statement made by Dr. Harris, or one of the men discussing Dr. Harris' very valuable paper, and that is in regard to the use of iodine and neosalvarsan. I think you are going to find that of value in this class of patients, but you are not going to find iodine of any particular value in strictly tuberculosis. We treat this one very exceptionally, and I want to emphasize the importance of the use of iodine in this class of cases, particularly because most of our cases cleared up under iodine.

Another point in diagnosing these cases, please remember that most of them present a very definitely large area of involvement with a comparatively low toxicity. In other words, Dr. Wallace in his description of the case tells us that practically all lobes of both lungs in that case were involved and were well up in the active stage, but that the toxicity was very low, practically secondary. Another point of interest that has

been brought out shows that there is not the terrific loss in weight in this class of cases.

Dr. J. B. Wallace, Tampa, (closing):

I do not think there is anything further that I can say, but I do want to call your attention to the possibility of this type of respiratory tract infection existing here. Undoubtedly this patient got it from somebody else, as he had never been out of the State. So at least there is one more case here that has been overlooked. That is all that I can say.

HIGH BLOOD PRESSURE FROM THE STANDPOINT OF THE OCULIST.*

MICHAEL PRICE DEBOE, M. D.,
Miami, Florida.

In dealing with this subject, which is as interesting to the specialists as it is to the general practitioners, there are three points which I should like to bring to the attention of this scientific assembly. They are: The two cardinal signs seen in the fundus, and a suggestion as to cause of high blood pressure.

Many patients, who consult the oculist for symptoms referred to the eye, present these unmistakable signs of hypertension and are surprised when told of it, as they, probably, have never been sick before in their lives. In making routine fundus examinations, many conditions are diagnosed which the patient or his physician never before suspected.

The first sign is commonly called the pressure sign. It is elicited by following a vein from the disc to a place where an artery crosses over. From one to three arterial diameters (taking the artery at point of crossing as standard of measurement) on either side of the artery the blood is pressed out of the vein. The significance of this condition is, that there is an imbalance between the normal relative intra-arterial and intravenous pressures. This has been proved clinically to be primarily a sign of high blood pressure. It occurs in arteriosclerosis, but you can readily see why. In cases where arteriosclerosis ultimately takes place this sign appears first. It occurs in hypertension of the menopause and passes if this condition clears up. In personal observation it is almost as positive as the reading of the blood pressure instrument.

The second sign is actual arteriosclerosis of the retinal arteries. In the first stage there is an irregularity in the arterial walls. Later there is a beading of the arteries. Then finally there is an obscuration of the red lines. This last is due to infiltration of lime salts into the walls of the artery, making it opaque. This sign, in the light of observation and experience, practically means high blood pressure.

As the retinal arteries can be taken, practically, as an index to the terminal arteries all over the body, this sign is of vast prognostic importance. We can readily see, the chances are, that if the terminal arteries are sclerosed there can be no let up in blood pressure till the heart breaks down. This is not an infallible sign, but is the general rule. O'Hare and Walker, in their masterly paper in the archives of Internal Medicine, tabulated a number of cases that had peripheral sclerosis with a low blood pressure, but in the majority of cases where there was retinal sclerosis, there was or had been hypertension.

We, therefore, draw certain conclusions from our own and the findings of others: First, high blood pressure does not necessarily cause arteriosclerosis because we can have arteriosclerosis without it. Second, peripheral sclerosis does not cause high blood pressure, but terminal sclerosis, if sufficiently extensive, may cause a continuation of hypertension until the heart breaks down. And lastly we may conclude that the condition of the retinal arteries comes next to the blood pressure instrument in the diagnosis of this condition, and is pre-eminently the best single prognostic sign except the findings in the urinalysis.

As to the cause of this condition, let us remember that this is merely a suggestion, as there is nothing as yet proved.

The evidence in favor of the fact that it is not caused by an indiscrete or imbalanced diet is obvious. If this was not so, then in a symptom complex as clearly defined as chronic cardiac-vasculo-renal disease, the most important symptom of which is hypertension, we would as invariably get it as a result of a certain diet as we get scurvy with a certain diet, but we do not.

If alcoholism or nerve strain were specific causes then why do not all patients develop it as they do delirium tremens or neurasthenia if these two respective causes were carried to their ulti-

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mation? Conversely, why is it that vegeterians, total abstainers and people living under conditions very favorable to their nervous systems, do have it?

We may say that it is due to some toxic substance in the blood stream acting upon the muscular walls of the terminal arteries and heart or upon the vasomotor and cardiac centers. Or it probably has a specific action on the ductless gland system producing an imbalance in their different secretions or producing some new active principle in the secretion of one or more of these glands disturbing metabolism in this specific way.

In speculating upon the modus operandi of this condition we are reasoning from premises which have not been proved but assumed. In exercising our reasoning in this case, let us for a moment consider the parallel case of tetanus. We know that tetanus is caused by a specific organism because we have proved it. At the same time we have a definite symptom group by which we can make a diagnosis. In chronic hypertension, after excluding all other probable causes except the parasitic, we have a symptom complex which points as conclusively to a specific infection as its cause, as we have in the case of tetanus.

The only evidence I can bring to bear to substantiate my suggestion of a specific infection as the cause of the condition under discussion, is the fact that of all the cases I have seen in the last five years, also those seen by Dr. Lowe, approximately ninety per cent presented a demonstrable focus of infection in the tonsils or teeth, the infections in the tonsils predominating.

That does not mean that any focal infection may cause high blood pressure, because we have all seen hundreds of cases of focal infection whose blood pressure was normal. But it is suggestive, that in the cases of hypertension where such a high percentage of them show focal infection, that some of the organisms gaining entrance into the body through these channels may be the offending ones.

In conclusion, we know as much about the specific germ causing high blood pressure as our forefathers knew about the cause of malaria a century ago, but let us hope that the future will bring us promised facts, upon which we will be able to base a specific treatment.

Summary: By examining the retinal arteries we can get a diagnosis and a tentative prognosis of high blood pressure. And the symptom complex in chronic hypertension is so clearly defined that in the light of past experience and observation, reason suggests that it is a symptom of a disease caused by some specific organism.

DISCUSSION

Dr. Shaler A. Richardson, Jacksonville:

I think Dr. DeBoe has brought us a very important message in this masterly dissertation on the fundus findings in hypertension and arteriosclerosis. In the ophthalmic findings one is often able to definitely diagnose arteriosclerosis, but by putting aside all other means of diagnosis and using this method alone, we occasionally fail to make a diagnosis.

The question of etiology, of course, is a most important one, and is quite obscure. Up to the present time I think our best bet can be stated in the three T's—teeth, tonsils and toxemia.

One of the most impressive things about the findings in the retinal circulation may be summed up in the statement that the optic nerve and retina is but a prolongation of the brain, and any changes in the vascular system of the retina indicates practically the same condition in the cerebrum.

Knapp once stated that in any case in which he observed retinal hemorrhages he considered the prognosis a serious one. Gies observed seventeen cases of retinal arteriosclerosis over a period of four years, all of which died from apoplexy. Raehlman states that in two hundred and ten cases of retinal sclerosis that he had observed, which have gone to post mortem, he had found cerebral sclerosis in 50 per cent.

I think that the cooperation between ophthalmologists and men practicing general medicine should be a little bit more whole-hearted. Frequently, as ophthalmologists, these cases come to us stating that they have had a sudden loss of vision, probably within twenty-four or forty-eight hours previous to the examination. On examination of the fundus we find that they have had very extensive retinal hemorrhages. These hemorrhages may involve the macular region, greatly reduce the vision, or they may be in the periphery of the fundus and not involve the central vision.

In my opinion, when these cases are observed by the ophthalmologist, they should be immediately referred to the internist, and they should be treated conjointly. They are just as much an emergency as an acute appendix should be to the general surgeon, for the reason that practically

all of the patients that we see with retinal hemorrhages from arteriosclerosis have a very high blood pressure, and if the patient is up and moving about and no effort is made to reduce the pressure, you are very sure to have more hemorrhage.

Dr. W. R. Warren, Key West:

I just want to say one thing in emphasizing what Dr. Richardson has just stated in regard to the importance of all cases of cardiac-renal disease being referred to the ophthalmologist.

I have had the pleasure and opportunity in a great many instances of referring my cases to Dr. DeBoe with a great deal of help, and in turn he has sent me a good many of my cases that I had not seen for some time on account of their not being sick enough to come to a doctor except for failing eyesight. In that way my first knowledge of the condition of the cardio-vascular system was given me through the ophthalmologist. So I think it would be well for any general practitioner in any case of cardio-vascular-renal disease to refer the case to the ophthalmologist for his opinion and report, because his findings have an important bearing on prognosis.

Dr. M. P. DeBoe, Miami, (closing):

Chronic cardio-vascular-renal disease accompanied by the symptom of high blood pressure is a definite symptom complex. I am suggesting that it is due to infection by some specific organism or organisms, acting on the nerve centers, ductless glands or the circulatory system and coming from some of the common locations of focal infection.

I feel that we are due this condition careful consideration in our research work.

CISTERN PUNCTURE, ITS USES IN DIAGNOSIS AND TREATMENT.*

H. Mason Smith, M. D.,

Tampa, Florida.

The necessity of reaching the subarachnoid space at other points than the lumbar sac has given rise to many procedures, such as puncture in the thoracic and cervical regions, puncture through the sphenoidal fissure and introventricular puncture.

Until recently, there has been nothing written in reference to puncture at the cistern, although this has been a common method of obtaining spinal fluid from animals. In 1919, Wegeforth, Ayer and Essick, after considerable preliminary study on the cadaver, published a method of approach to the cisterna magna and since that time this procedure has been in common use. This method has been found easy and no serious consequences or alarming symptoms have occurred when the technic developed by these gentlemen has been closely and intelligently followed.

The greatest advantage in going into the cistern is the fact that the cisterna magna is really the distributing center of the spinal fluid circulation, and if there is a focus at any point in the cerebrospinal nervous system, one is more likely to find abnormalities in the spinal fluid there before it will appear elsewhere. The spinal fluid originates in the choroid plexus, passes down through the ventricles into the cisterna magna and from there goes to the cortex and to the spinal subarachnoid cavity.

TECHNIQUE

Cistern tap is really not more difficult than a lumbar puncture, as a much greater space is afforded for entrance there than is in the lumbar space.

The patient is placed on his side as for a lumbar puncture, the same antiseptic preparation and anesthetization with procaine as for a lumbar puncture. The thumb of the left hand is placed on the spine of the axis, the needle is inserted just above the thumb and is directed forward and upward in line with the external auditory meatus, until the dura is pierced. When the cistern is entered from this angle there is a distance of 2½ to 3 centimeters between the dura and medulla. It is a good idea, in order to obtain entrance at the proper angle, to direct the needle a little higher and if the occiput is struck, to withdraw slightly, depress the needle just enough to get by. When the dura is pierced, the same "give" is felt as in a lumbar puncture.

The needle used is a regular lumbar puncture needle of 18 gauge. There is less variation in depth of tissue traversed in going in to the cistern than in going into the lumbar sac, the distance is usually between 4½ to 5 centimeters, never over six, so a faint circular scratch is made on the needle at 5 or 6 centimeters for judging the distance.

*Read before the Fifty-first Annual Meeting of the Florida Medical Association, held at Orlando, May 15, 16, 1924.

DIAGNOSTIC PROCEDURE

The cistern puncture is of most value in the diagnosis of cord compressions, spinal bloc of post meningetic adhesions, and syphilitic exudates. In ascertaining these conditions, a combined cistern and lumbar puncture is required, also the use of spinal fluid manometers. When there is a cord compression, a meningeal adhesion of a syphilitic exudate existing between the cervical region and lumbar, there may be the same pressure at these points, but on the withdrawal of 5 cc. of spinal fluid from the cistern, a reduced pressure will follow in the cistern and not at the lumbar tap. Jugular compression will cause a rise of spinal fluid pressure at both points when there is no obstruction, but when there is a bloc or partial bloc, this rise is seen only at the cistern, the lumbar pressure remaining the same. Abdominal compression raises the pressure at the lumbar space in case of bloc, but will not raise it at the cistern. There is an oscillation of one millimeter with every pulse beat and four with each respiration at both cistern and lumbar regions when there is no bloc. In cases of bloc, this oscillation is only at the cistern. There is also found a difference in the cell count and protein content of the specimens of spinal fluid taken at the cistern and lumbar spaces.

TREATMENT

There is possibly more promise in the treatment of meningitis by serum injection into the cistern than by any other route. Clinical evidence points toward the cerebral rather than spinal involvement in the beginning of meningitis. Hence, it would be advantageous to get the serum to the most infected areas as early as possible, and when the infection is cerebral this can be done more readily by the cistern route. It has been shown that substances introduced in moderate amount under normal pressure into the lumbar sac reach only a little higher than the base of the brain. I have seen 20 cc. of serum introduced in the lumbar sac, which does not appear in the cistern during the period of cistern injection or cistern puncture, which was about twenty minutes. It has been shown by Ayer that injections of 30 cc. of india ink into the lumbar sac of a cadaver barely blackens the base of the brain, but when this same amount is put into the cistern, it not only blackens the base of the brain but also the cerebral cortex, so theoretically, this is the most direct route for injection of serum in meningitis.

Irrigations of the subarachnoid space have been done by Eagleton of Newark, N. J., the injections being made at the point of infection in the cerebrum and drained out through the cistern and lumbar spaces, a double puncture being done in these places. He reports a number of recoveries from this operative treatment. The irrigations are frequently made in fulminating types of meningitis by an injection of a normal salt solution into the system and drained up in the lumbar space. This removes the toxic purulent spinal fluid, which is replaced by a clean normal salt solution and aids the phagocitic functions of the arachnoid membrane. The value of this procedure is still a matter of speculation and not enough work done to obtain any valuable statistics.

DISCUSSION

Dr. J. Q. Folmar, Chattahoochee:

In view of the points which Dr. Smith has brought out, it would not be amiss to emphasize one point slightly which he did not bring out, and that is that this procedure is not one that is free from danger, and it is not a procedure which is not liable to be met with serious consequences unless one is familiar with the anatomy in this region, and also the method proceeding in doing the puncture. No one is justified in attempting a cisterne puncture on a live individual until he has thoroughly studied it first by operating the cadaver.

The most important use of the cisterne puncture, in our mind, is in the treatment of meningitis, where you are able to get the serum in more direct contact with the infected area than you are in the lumbar puncture.

Another fact, which is well worth consideration, is that these patients should remain in the recumbent position for some time following the cisterne puncture. So far as I am aware, all of the deaths or untoward symptoms that have been noted following this puncture have been in patients who have immediately resumed the upright position following it.

Dr. J. H. Randolph, Jacksonville:

My experience with the cisterne puncture is very limited, and I want to say that I have listened with a great deal of pleasure to these men who have had a great deal more experience with it than I have.

Unfortunately my experiences have not been very encouraging. They were limited to only

two cases, both of which were cases of meningitis and each of a severe type, and cisterne puncture was undertaken only as a last resort. I might add that it was the last resort; both patients dying probably one or two hours after each of them.

As to the advantages of cisterne puncture in meningitis, I am not as yet fully convinced. As Dr. Smith says, it certainly allows you to bring the therapeutic substance into contact with the fluids there at a point that is possibly more advantageous, and if resorted to early all right, but certainly not in cases of extreme infection or inflammation where the foramina into the ventricles have been blocked or partially blocked. In such cases I do not feel that substances injected into the cisterne can reach the meninges over the brain, nor can the ventricles be drained any more effectively than through spinal puncture. And on the other hand if said foramina are not blocked, the drainage through the spinal canal is just as efficacious and slightly less dangerous.

Dr. H. Mason Smith, Tampa, (closing):

I would like to state in regard to the danger of this procedure, that in going into the cisterne by this method you point the needle directly above the tenth nerve. Since there is a distance of 2½ cm. above the medulla and since there is a very large space laterally, you can, by a little experience, acquire a certain amount of skill in doing this puncture.

On one occasion I have seen quite a little blood come out from the cisterne puncture, but at that time nothing serious happened to the patient. When we get blood, as a rule when doing the cisterne puncture, and it appears that we will get a little pressure in the medulla, we quickly withdraw the needle before piercing the medulla. It is better not to get in at all than to have to remove it afterward.

CURETTAGE.

G. H. Edwards, M. D.,
Orlando, Florida.

In this brief paper I do not propose to go into any special discussion regarding the uses and abuses of the curette. I am simply going to emphasize several features of its use which have proved very satisfactory in my hands.

I might state that the curette is about 80 years old. It was first introduced by Recamier in 1846 and like many new instruments, systems of treatments and drugs, it has been advocated as a cure-all for probably every known pathological condition in the pelvis and like all other innovations, it has its uses and its limitations. These are being made more and more clear, not only to those who are doing experimental work, but also to you and I, the general practitioners, for as we look back we recall certain cases in which today we would not use the instrument or we would use it in a different manner or at another period in the condition.

In 1807 Dr. John Stearns of New York discovered the specific action of ergot to induce contractions of the uterine muscles and from that time dates specific uterine medication. Previously, prayer, incantations, wafers, a pot of urine under the bed, etc., had been used to control uterine hemorrhage. It was nearly 40 years afterwards that the virtue of ergot was recognized abroad, but the curette immediately found favor everywhere.

Today the curette has practically three functions; its use in obtaining specimens of the endometrium; second, for the cure of leucorrhea and, third, to stop some types of uterine hemorrhage. In the first instance it still has its field; in the second, the work of Sturmnadorf, Polak, Colbretson and others would seem to lessen its field of usefulness. They have demonstrated beyond doubt that most leucorrheas have their origin in the cervix and not in the body of the uterus and that local treatment of or operations which extirpate the cervical mucosa are far superior to scraping off the outer two-thirds of the glands. In the last instance, uterine hemorrhage, it still has a large field of usefulness, although in the case of incomplete abortions the use of pituitrin and Murphy's axiom, "wait," has rendered it less frequently necessary.

My preliminary treatment consists of an enema and a douche given, if time permits, both the night before and shortly before going to the operating room; the patient is allowed regular diet the day previous but has no food after retiring, although fluids are allowed, that is water, tea or bouillon, up to four hours before the operation. One hour before, the patient always receives one-fourth morphine and one-hundredth of atropin. She will go to sleep more quietly and take less anesthetic and have less discomfort afterward. Patients who have a lung lesion or

to whom for any reason you do not care to give an anesthetic, a second hypo of morphine one-half hour after with hyoscine one-hundredth grain, renders the patient so quiescent that the operation may be completed without an anesthetic or with only the administration of a few drops of chloroform as the cervix is being dilated.

Anesthetic may be of choice. As the anesthesia is begun, the patient is given one ampule of surgical pituitrin. This renders the uterine walls so firm that the danger of pushing the curette through the wall is materially lessened. I think all who are doing much gynecological work have had that very disturbing sensation which developes when you pass the curette in and in and in, with no resistance and realize you are in the abdominal cavity, and this may occur even with a careful operator, for the uterine wall may be so soft and flabby that it cannot be readily identified. The free hand placed above the symphisis and pressing down into the pelvis behind what we take to be the uterus makes its presence more positive. With the pituitrin this procedure is not as essential, although it may be used to advantage when you have retained material following a late miscarriage. Another virtue of pituitrin is the control of hemorrhage. The uterine muscle fibres, by contracting upon the blood vessels of the uterus, lessen their calibre and consequently lessen the flow of blood. This being done at the beginning of anesthesia, renders the operation often very nearly bloodless.

I am preparing the patient on the table by using a 5 per cent solution picric acid in 70 per cent alcohol and paying especial attention to swabbing the inside of cervix as well as vagina.

I believe in the use of the tenaculum very little downward traction should be made. It should be used simply to hold the uterus in position. Endeavoring to pull the cervix to the outlet of the vagina puts too much strain on the ligaments and is the first step in the production of a retroversion.

Dilation if necessary should be done gently but firmly, the more time devoted to dilating a rigid cervix the easier the curettement will be. Sudden forcible dilation will not infrequently give you a laceration. In case of incomplete abortion or evacuating a pregnant uterus, matters will be expedited if the placental forceps are used first in removing all loose material. Currettement is performed by the use of an irrigating curette using a hot ½ per cent lysol sol. container at a moderate elevation. This washes out the shreds of endometrium as fast as they are removed from the wall. If the shreds are large they may tend to clog the opening, but that is easily kept patent if a pair of artery clamps are passed in beside the handle of the curette to pull the clogging material out. The curette should be applied gently and preferably in consecutive strokes over the whole uterine surface. By changing the angle of the curette head the fundus of the uterus can be curetted by strokes from right to left or vice versa. As I mentioned before, care must be exercised, for with surprising ease, in a flabby-walled uterus a curette may be passed right through. Fortunately if the uterus is nonseptic the error causes no great disturbance, although if you are using the irrigating curette as I do a considerable amount of fluid may find entrance into the abdomen. I recall one instance in which I ran in one-half a pint or so before I realized what had taken place. Aside from considerable abdominal pain the next two days, nothing untoward occurred and the patient has since had a child with little disturbance while carrying it. This error has been committed by the best men in the country. I well recall during my internship days of thinking and discussing with other interns the carelessness of the attending gynecologist, a very clever operator, in committing such an error. But not long thereafter I "lost my curette" and I can assure you since then charity has been my middle name.

In cases in which there has been much leuchorrhea, if I do not do a repair, I frequently swab out the cervix only, with a mixture of phenol and iodide aa. You will find it rarely necessary to pack the uterus if you thoroughly remove all mucosa and foreign material. However, if you do pack it, the removal of the packing should be accomplished by the fingers of one hand in the vagina pressed firmly against the cervix holding it in its posterior position and drawing out the packing with the other. If you do not thus hold the cervix back you are quite apt to drag the uterus down so that it will fall into the position of retroversion.

The last thing to be done before removing the patient from the table is to carefully replace the uterus. I well remember the positive statement of my professor, "Always replace the uterus," and I always did it but I suppose in a more or less careless way; but his aphorism was most forcibly brought to my attention again when one

of my patients returned to me a month or more after a curettage complaining of great discomfort over the sacrum. Examination revealed the uterus retroverted. Fortunately I was able to replace it without an anesthetic and immediately relieved her of pain. A uterus which has been retroverted for years may not retain its position if replaced, even with the use of a pessary, but at least we should see to it that an operation for one condition does not produce another condition which is extremely disturbing. This carelessness, unfortunately, is not rare.

In conclusion I will mention these points in the technique which have increased my satisfaction in my own work:

1. The early use of pituitrin to control hemorrhage and render the uterus more firm.
2. Increasing care in use of the curette.
3. Care in removal of packing if any is used.
4. Careful reposition of the uterus, before the patient leaves the table, and this last is by far the most important.

REGIONAL ANESTHESIA IN SURGERY OF THE KIDNEYS AND PROSTATE

By WINFIELD SCOTT PUGH, M. D.

From the Urological Department (James Buchanan Brady Foundation) of the New York Hospital.

In no field has the value of regional anesthesia been quite so thoroughly demonstrated as in that of the urinary system. Many of these patients when they are first referred to us are of the class known as poor surgical risks and we constantly find them with a low phthalein output and a high blood urea. The presence of chronic urinary lesions is conducive to the development of a chronic myocarditis and the cardio-renal-arterial syndrome is a frequent occurrence. The development of the preliminary and post-operative treatment in this class of patients, notable by Lowsley, is largely responsible for the decrease in the mortality rate in urological surgery. Of scarcely less importance, however, is the question of anesthesia. Any general anesthetic, even nitrous oxide and oxygen, produces a certain amount of shock and has a repressive tendency on the functional activity of the kidney which must be reduced to a minimum in this class of cases.

In such a brief paper I shall not attempt to discuss any preliminary technique but will limit myself to the anesthetic methods we have found best suited for use in renal and prostatic surgery.

SUPRAPUBIC PROSTATECTOMY.

Many American surgeons have adopted the following technique in conjunction with their prostatectomy by the superpubic route. An area in the midline of the abdomen extending about six inches in length between the symphysis pubis and the umbilicus is infiltrated with one per cent novocaine. The infiltration as a rule is first made into the skin and subcutaneous tissues, after which they are incised. Each corresponding abdominal layer is treated in a like manner until we reach the prevesical fascia. The latter is then infiltrated, retracted and the bladder exposed. It is wise to also infiltrate a small area on the bladder wall before opening that viscus. The second stage of the prostatectomy is usually conducted under nitrous oxide anesthesia.

European surgeons differ considerably in their technique, but the majority practice the methods as used in the clinics of Hackenbruch of Tena and Jellyes of Budapest. Hachenbruch, after an extensive experience in local anesthesia, is most favorably inclined to the following procedure: Four preliminary subcuticular wheels are made at the following points, viz: First, at about an inch below the lower edge of the umbilicus in the median line; second, in the median line just above the symphysis pubis, while the third and fourth are made at the outer border of each rectus abdominalis muscle, but midway between the first and second wheels. This forms a diamond-shaped area and from the four points of the figure superficial and deep injections of one per cent novocaine are made. From the upper and lower points the injections are made toward the center of area and toward the lateral points. From the lateral points the injections are made toward the center and the upper and lower poles. A needle about eight centimeters long is used and in this country the local anesthesia apparatus of Dunn or of Babcock are well adapted for this technique.

After a few minutes' pause the usual incision is made down to the prevesical fascia, which is in turn infiltrated and retracted. If any pain appears at all it will be at this point, so we must exercise care at this stage. The bladder is now exposed, infiltrated at the point of incision and opened. Europeans in their prostatic surgery always use a preliminary catheter drainage and

find almost all of their patients tolerate it without annoyance. They are therefore enabled to do the prostatectomy in one stage.

When the bladder is exposed the patient is placed in a modified Trendelenburg position and the prostate appears in view. The prostate and the prostatic capsule anterior, posterior and laterally is injected with novocaine and the gland then enucleated. This method is usually entirely painless until the gland-removal stage and this is always apparently a little uncomfortable even to the stolid European.

Professor Jellyes of Budapest uses quite a different technique. With the patient in a modified knee-chest position he first makes an injection into the caudal canal at the tip of the sacrum. About thirty cubic centimeters of 1 per cent novocaine is very slowly injected in the canal. After a few moments rest the patient is turned over on his back and the anterior infiltrations are started. Some of the workers in this large clinic insist that most suprapubic cystotomies can be done with the sacral anesthesia alone. This point I doubt very much and it is notable that none of those who feel confident on this point ever operate without an anterior infiltration. On the anterior abdominal wall Jellyes makes nine small wheels as follows: One just above the symphysis pubis, one just below the umbilicus and one midway between these two. At points just opposite to these and corresponding to the outer border of each rectus abdominalis muscle, other wheels are made. Thus we have three wheels in the middle line and three at the outer border of each rectus muscle. This is also a one-stage operation, as preliminary continuous catheterization takes the place of the usual first-stage cystotomy. It is a remarkable fact that all these patients stand continuous catheterization without apparently any untoward effects.

From each one of the wheels noted superficial and deep injections are made into the skin and muscular structures. One per cent novocaine is the anesthetic solution of choice. From the upper wheels injections are made downward and toward the midline of the abdomen, while from the middle row the solution is directed upward and downward. In our injections from the lower wheels, we direct our needle upwards, toward the center and also toward the lateral borders. This procedure gives a very thorough infiltration and quite an adequate area of anesthesia and there is no annoyance to the patient after the preliminary needle punctures. The bladder is now distended, the prevesical tissues are slightly infiltrated before retraction. When the bladder appears in view it is slightly infiltrated along the line of proposed incision and then opened; the prostate being removed under direct vision.

In our own operative work we seldom perform prostatectomy by the suprapubic route except in those prostates which protrude well up into the bladder and are only satisfactorily reached by this method. This recalls to our mind the remarks of Watson, who in 1888 said: "The typical cases for suprapubic prostatectomy are the enormous prostates or those enlargements of considerable size which extend well up into the pelvis and where the lobes project up into the bladder. They are liable to be out of reach of the finger working through the perinæum and the logical route of attack is from above.

In many of our prostatics we, however, find a preliminary suprapubic drainage the most satisfactory procedure even when we intend removing the gland itself later by the perineal method. The question of drainage in prostatectomy is an important one and we believe this method gives us the correct answer. In suprapubic cystotomy for drainage we find that the anterior triangular injection as used by Rubrituis to be quite satisfactory and causes the patient a minimum of disturbance. We have had no success, however, with the removal of the prostate under prostatic infiltration anesthesia.

PERINEAL PROSTATECTOMY

Our choice of prostatectomy as previously noted is usually by the perineal route, as the majority of our cases seem to be of the low-lying type of gland. We have felt for a long time that the ideal prostatectomy would be performed under regional anesthesia. I do not believe, however, that a satisfactory prostatectomy can be performed with sacral anesthesia alone, but combined with parasacral after the technique of Lowsley,[1] it leaves nothing to be desired. It always being advisable for one to look up his anatomy before trying a new technique, I shall not enter into a discussion of that feature.

Our patient lies on his chest and abdomen, his head to one side and a small pillow passed beneath his lower abdomen. We then look for the

[1]Lowsley, O. S.: Major urological surgery under sacral and parasacral anesthesia. Surgery, Gynecology and Obstetrics. V. 37, Nov., 1923, pp. 686-692.

sacral hiatus and as a rule this is not difficult to find, the sacral cornua being good landmarks. We slowly introduce our Labat regional needle at the hiatus into the caudal canal. It is then advisable to wait a moment to see if there is any spinal fluid or blood coming from our needle. If blood or spinal fluid appear it is wise to withdraw the needle and go on with the parasacral technique, on its completion returning to the sacral. However, if blood or spinal fluid appear in any quantity, it may be advisable to postpone the operation. Before we begin to inject the caudal canal, it is always advisable to have someone watching the pulse and blood pressure. It is our custom then to inject very slowly thirty c.c. of a 1 per cent solution of novocaine. At the same time we must watch the tissues over the sacrum just above the corna for signs of infiltration; if this occurs we are not in the canal. Our observations have shown that if the pulse or blood pressure is going to be effected by the anesthesia it will occur at the time of the caudal injection. If stimulation is necessary as a result of falling blood pressure caffein citrate gr. ½ hypodermically seems to be the best drug for the purpose. Upon completion of the caudal injection we proceed to the parasacral injections. The location of the sacral foramen posteriorly are very easy to find, even in well-developed patients, as a distinct depression can usually be detected about 2 cm. from the median line. There are a few cases in which the area over the foramen of the sacrum appears to be absolutely flat and these often cause a little more trouble.

We usually inject the three upper sacral foramen on each side. It is rarely necessary to attempt blocking the lower foramen as the nerves from this area do not seem to enter our field. The foramen is located with the index finger and our needle is then passed over the end of the finger directed, forwarded and inward toward the middle line. When the needle strikes bone we have gone far enough and then inject about one or two c.c. of the 1 per cent novocaine about the foramen. The same procedure is repeated until all of the six foramen and their nerves are blocked. There are two points here that one must be cautious about, we must not get into the vessels, and one is usually found issuing from each sacral foramen. One must also be most careful not to puncture the rectum and I must call your attention to the fact that the bladder has also been punctured in this procedure. It seems almost incredible, but the needle in the bladder puncture case seemed to pass around the rectum and when the operator withdrew the plunger of his syringe was rather startled to find his barrel filled with urine. Fortunately no damage resulted, but it will serve to demonstrate a possible accident. It is our routine to begin the operation twenty minutes from the time we first started the caudal injection. This gives the anesthetic effect of the drug an opportunity to develop to its fullest extent. As in all regional procedures even with a mildly toxic drug, evidences of toxicity appear, but are as a rule mild and fleeting. The Brady Foundation has been for some time past working on a new local anesthetic that is said to be one-twentieth as toxic as cocaine and possessing antiseptic qualities in addition. This drug, which has been given a temporary name of anetine, seems to promise well.

Chute[2] of Boston has had excellent results from the use of spinal anesthesia in his urological surgery, particularly in the operation of prostatectomy. While this experienced surgeon has had the splendid results he reports, many of equal experience have been just as unsuccessful as he has been successful. There is no denying the fact that there is more to disturb one's peace of mind in the possible sequelæ of spinal anesthesia than there is in the regional method. It has been our fortune or misfortune—I do not know just which to call it—to have seen grave results follow the use of the spinal technique. Among these cases were two patients who developed a paraplegia, one of which lasted six months; the other case died in about six weeks of pneumonia. I feel reasonably sure that the pneumonia was secondary to the paraplegia, as most patients suffering with lesions of the nervous system, usually die of a pulmonary consolidation.

CYSTOSCOPY.

For the performance of cystoscopy in badly diseased bladders as in tuberculosis; fulguration of large tumors or such other intravesical techniques, as litholapaxy, nothing equals sacral anesthesia. Sacral anesthesia can be used either in the hospital or in the office as recommended by Scholl.

OPERATIONS ON THE KIDNEYS.

In all of our renal operations and in those involving the upper third of the ureter we have found paravertebral anesthesia best suited for this purpose. In looking over the history of

[2]Chute, A.: Spinal anesthesia in urological surgery. Address New York Academy of Medicine, Nov. 16, 1923.

anesthesia we find that paravertebral anesthesia was first worked out by Sellheim[3] in 1906, as part of extensive researches in abdominal surgery. Sellheim's original idea apparently was the development of a regional technique to be used in place of general anesthesia in abdominal operations. His early work was not very successful. Paravertebral anesthesia is much better adapted to operations which require a one-sided nerve blocking, than in those requiring a bilateral technique. In 1911, Arthur Lawen[4] of the University Clinic at Leipsic did the first nephrotomy under this method of anesthesia. This we may count as the real introduction of the method in urological surgery. Shortly after its demonstration by Lawen it was taken up by Finsterer of Vienna, and recognized as a valuable procedure. From Vienna the method then spread over Europe, where it is now extensively used, particularly by Braun,[5] Ziegel, Kappis[6] and in the large urological clinic of Jellyes.[7] In the latter over 1,800 operations have been carried out with paravertebral anesthesia alone. Hartel[8] tells us that this technique requires an exact knowledge of the skeletal structures in order to attain a successful anesthesia. After some anatomical studies made in connection with this method, we are thoroughly in accord with that eminent surgeon.

Among European surgeons, and particularly Jellyes, it is not customary to use any preliminary morphia or atropine, as they think the patients are better without it. Our patients, however, are, to say the least, not quite so stolid as the European and require much more preparation than their brothers across the sea. It is our custom to use about 1/6 gr. morphia and 1/100 g. atropine about an hour before the operation, as it has seemed to us our patients respond better to the anesthetic by so doing.

It is quite important that the patient be disturbed as little as possible and should be taken to the anesthetic room lying flat on his back, never allowed to walk. It may be well to explain to the patient the advantages which he will derive from a painless operation and a minimum of postoperative discomfort. He should also be apprised of the fact that he will feel a few needle punctures, and as he will then expect it, will not be alarmed when they occur.

In our paravertebral anesthesia it is essential that we block the eighth to the twelfth thoracic and the first lumbar nerves. These nerves supply the anterior, lateral and posterior surfaces of the abdominal wall, including all the superficial and deep layers of skin and muscle. It is true that the lower lumbar nerves do at times send branches to this area, but they are fully controlled by what is known as the quadratus block and which I will describe below. It is important to remember in connection with paravertebral anesthesia that at the points where we begin our block of the thoracic nerves, we are only separated from the pleura by the internal intercostal fascia. The pleura is also a little closer to the surface on the left side than it is on the right. When we are ready to start the nerve blocking it is best to have the patient sitting on the edge of the table, his feet resting on chairs that just allow the thighs to form a right angle with the abdomen. The body should be bent slightly forward, the head bowel a little and a trusty attendant should stand in front of the patient to provide any necessary support.

As an anesthetic we use 1 per cent novocaine, with the Labat regional anesthesia syringe and needles, which are quite ideal for this purpose. A series of wheels are first made in the intercostal spaces about two fingers' breadth from the spinous process, beginning at the eighth, which is usually opposite or a little below the angle of the scapula. These intercostal wheels are continued down to the twelfth dorsal nerve, which is however subcostal.

After these preliminary wheels are made, we go back to the first and pass our needle directly into the wheel at right angles to the rib, injecting a little novocaine until we reach the lower rib border. We then withdraw the needle slightly and turn it at an angle of 40 to 450, and direct it fairly close to the lower border to the rib, press the needle in, injecting slowly as we go until we reach the transverse process. About 5 c.c. of novocaine is used in each one of these injections which are then continued in the same manner until the twelfth dorsal nerve is blocked. It is true there is some danger of puncturing the plura,

[3]Seelheim, H.: Die Herabsetzung der Empfindlichkeit der Bauchdedsen, und das Peritoneum durch perineurale injection anesthesiender losungen an die stamme der Nerven intercostales des subcostalis des iliohypogastricus, und des ileoinguinalis. Verhandl. d. Deutsche Gesellschaft & Gynak, 1905, pp. 176-179.

[4]Lawen, A.: Paravertebral Leitungs anesthesie. Muenchener Med. Woch., LXVIII, June 27, 1911, pp. 1390-1391.

[5]Braun, H.: Local anesthesia translated by Shields. Lea & Febiger, Philadelphia, 1914, pp. 320-321.

[6]Kappis, M.: Der Gegenwartige-stand der Ortlicher Betaubung bei operation an der Harnorgan. Zeit. f. Urol. Chir., Vol. X, pp. 114-118. July, 1922.

[7]Jellyes, G.: Personal communications. 1923.

[8]Hartel, F.: Die Lokal anesthesie. Neue Deutsche Chirurgie. Band 21, pp. 259-266. Stuttgart, F. Enke. 1916.

but in the vast majority of cases we strike the rib first. When these intercostal injections are completed a wheel is made just above the anterior and posterior superior spines of the ilium, and one above each of these, the first on a line with the anterior border of the last rib and the other about two or two and a half centimeters from the spine of the first lumbar vertebræ. The area between these four points, being well over the quadratus lumborum muscle, is usually called the quadratus block. From these latter four wheels superficial and deep injections are made, the upper being injected directly downward and toward the center of the area, while the lower are injected upward and toward the center. The needles for this purpose should be about 8 cm. long.

The injections made into the area just noted very effectually block the ilio-hypogastric and the ilio-inguinal, the main branches of the first lumbar nerve. Any other branches of the lumbar nerves which may appear are well taken care of in this block. The anesthesia is only used on the side which we intend to operate on and as a rule we seldom use over 100 c.c. of the blocking solution.

It is usually advisable to wait a few minutes before starting the operation; this applies equally well, however, to all local and regional techniques. The oblique incision beginning at the edge of erector spinal and last rib, then continued in the direction of the anterior superior spine of the ilium is best adapted for use in connection with this form of anesthesia. I have seen this technique used many times in Europe and we have done a series of nephrectomies for tumors, nephrotomies for stone, and nephropexy, as well as ureterotomy with its aid. It is remarkable how little post-operative shock and pain is noted, as the anesthetic effect usually continues for a few hours after operation. It takes a while to familiarize oneself with paravertebral anesthesia, but it undoubtedly is the method of the future for use in renal operations.

Several American surgeons, notably Hertzler,[9] have performed nephrotomy for stone by the use of local anesthesia, each layer of the abdominal wall being anesthetized. We have also used this method but find it a little trying and one is much more restricted than by the use of paravertebral anesthesia.

[9]Hertzler, H. E.: Bilateral nephrolithiasis operation under local anesthesia. Surgical Clinics of North America. Vol. 3, number 6, Dec., 1923, pp. 1513-1518.

SUMMARY

1. Regional anesthesia is indicated in all operations on the kidney, bladder and prostate.

2. It reduces shock as well as urinary and cardiac disturbances to a minimum.

3. With a little practice all of the techniques are readily acquired.

4. Suprapubic operations may be done by one of several techniques.

5. Perineal prostatectomy is best accomplished by a combined sacral and parasacral anesthesia.

6. In renal operations, paravertebral anesthesia is the method of choice.

7. Difficult cystoscopies and intravesical techniques may be readily done under sacral anesthesia.

JAMES VOORHEES FREEMAN, M. D.

1876—1924

With the passing of James Voorhees Freeman, Duval county and Florida suffer an inestimable loss. He was most deserving of the love and admiration accorded him by the profession and public. His life was one of exemplary attainments, both as a physician and citizen. At a memorial meeting of the Duval County Medical Society, October 6th, the following tribute to his memory was made by James D. Love:

"I have been asked by our President to speak a few words regarding the life and accomplishments of one who for years has been one of our most distinguished members and who but recently presided over this society as its president.

"I am doing so with full cognizance of my inability to do justice to his character and attainment. I have enjoyed his friendship and acquaintance longer than most of you, and known something of his ambitions, his life, his love, his struggles and achievements, and we who know him best need no proof of the purity of his purposes and the untarnished quality of his aims.

"I have known him as a young man inspired by hope and high resolve and filled with dreams of great accomplishments, and I believed in the purity of his motives. I have watched his professional growth and have known him in his full maturity when his work had been crowned with success and popular love and praise had been his meed. I have known him as he was but a few days ago, loyal to his friends, loyal to his profession, happy in the love of his family and blessed with the confidence of friends and patients."

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TREATMENT OF TRYPANOSOMIASIS

The Rockefeller Institute for Medical Research has announced the release of the drug known as Tryparsamide for use in the treatment of human and animal trypanosomiasis (African sleeping sickness and *mal de caderas*) and selected cases of syphilis of the central nervous system. This action is based on results reported from clinical investigations which have been in progress for several years. The drug will be manufactured by the Powers-Weightman-Rosengarten Co. of Philadelphia, and will become available through the regular trade channels about January 1, 1925. In releasing the drug for the benefit of the public, the Rockefeller Institute desires it to be known that the Institute does not share in any way in profits that may be derived from the sale of the drug and that, with the cordial cooperation of the manufacturers, provision has been made for the maintenance of a schedule of prices on as low a basis as possible.

PUBLISHER'S NOTES

AN INTERESTING GROUP

Adrenalin, the original representative of the blood-pressure-raising or pressor principle of the suprarenal glands, introduced in 1901 by Parke, Davis & Co., has now an interesting group of offshoots—preparations which depend in whole or in part for their value as medicinal agents upon the adrenalin they contain.

There are Adrenalin Inhalant, Adrenalin Ointment, Adrenalin Suppositories, and, among the very latest and in some respects most remarkable combinations, an ointment which the manufacturers call Anesthone Cream because it has a local anesthetic effect in hay fever, rhinitis, etc.; there is said to be enough adrenalin in the formula to check excessive secretion and exert a reducing effect on the inflammatory condition to which much of the local irritation is due.

Adrenalin itself has many important applications, among which are to be reckoned the control of asthmatic attacks and the restoration of heart action in cases of shock or even apparent death.